



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

The Effects of a Division of the Vagi on the
Muscles of the Heart.

BY A. M. BLEILE, M. D., and ADOLPH FEIEL, Columbus, Ohio.

Some of the gentlemen present may remember that, at the meeting held last year, we presented a paper having for its object the demonstration of nutritive or trophic nerves for the heart. The procedure adopted was as follows: One or both *vagi* were divided in the neck and after a certain time the heart was examined. In all cases was found a fatty degeneration of the heart much sooner when after division of both nerves than if one nerve had been practiced on, and better marked the more the time had elapsed between operation and death. These results were all obtained on the rabbit. The society requested that this investigation be pursued further and a report be made at this meeting. Various causes have since prevented our carrying out the work as thoroughly and systematically as we could have wished. Chief among these was our inability to procure more than a few rabbits. We finally concluded to use pigeons, and even here we had some difficulty in procuring a larger stock of animals and a regular supply. The procedure with pigeons was in the same as that followed in the rabbit, one or double-sided vagotomy, and where animals did not die from changes superinduced by the operation, death by decapitation or nicotine. A small part of each heart was examined fresh, and the other portion divided into two parts. One was immersed in alcohol, the other in diluted chromic acid. We found that light staining facilitates examination, and of late have almost exclusively used a very diluted eosine solution, the preparation being immersed in this for one or two minutes just before teasing. The granules themselves are not stained by this agent, but

the slight tinging of the basis substance was found to be quite a relief in protracted observation. Teasing the pigeon-heart is a much more tedious process than with the rabbit-heart, nor can such satisfactory preparations be obtained, owing to the extreme delicacy of the fibers in the former. In preparing specimens of the normal heart for a standard, it was soon found that young pigeons were entirely useless for this work, as in them the muscular fibers are all finely granular, the cross-striæ being only indicated by a row of granules. This we verified with many hearts. Pigeons which have undergone double vagotomy die in from ten to thirteen days. Immediately after the operation they are profoundly affected; recover somewhat after a few days, though never fully, and death comes on suddenly without any noticeable signs. At the autopsy the crop is usually found filled with corn and a whitish, fetid fluid, but the direct cause of death is not apparent. In animals which have undergone a one-sided vagotomy only, everything appears to have passed off in a few hours, the pigeon appearing just as one uninjured, nor is there any microscopic change after death.

As a result of our work we would name the following points:

1. The fibers of the pigeon are more delicate and more friable than in the rabbit.
2. In young pigeons the cross-striation of the muscular fibers of the heart is indicated by the fine granules which might be mistaken for beginning degeneration.
3. Even in the adult pigeon granular fibers are occasionally found by the side of well-marked striated ones, the former being perceptibly narrower. Possibly the granular fibers are still embryonic and destined to replace the older ones as needed.
4. Recently Pohl. Rincus has pointed out that the frog's heart has two sets of muscles—the outer one termed the mouth, and the other forming by its arrangement into trabeculæ a system of lacunæ in which the blood circulates. In our pigeon-heart preparations blood corpuscles seem to lie in interstices, possibly corresponding to the lacunæ of the frog's heart, and these corpuscles, when altered by reagents, might be mistaken for larger fat granules.
5. After division of one vagus only there follows in the heart-muscle of the pigeon a finely, fatty degeneration, about equally

marked on both sides of the heart, and more plain the longer the animal has been kept alive after the vagotomy.

6. After double vagotomy the degeneration is better marked—i. e., the fat granules are large and appear sooner than after one-sided vagotomy. Hence we conclude that the vagus in the pigeon as in the rabbit carries trophic cardiac fibers,—no other explanation accounting for the changes found,—and that the influences descending by one nerve are sufficient to somewhat retard the degeneration on both sides which would follow a double division.